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INCIDENCE OF POLIOMYELITIS IN THE UNITED STATES IN 1944

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During the year 1944 the incidence of poliomyelitis was again above normal, 19,053 cases being reported in the country as a whole.[1] This number of reported cases has been exceeded only once in the past, namely, in 1916. In that year 27,363 cases were reported from 27 States and the case rate per 100,000 population was 41.4. However, in 1944 the rate was 14.9 for the 48 States and the District of Columbia. Since nearly all of the cases reported in 1916 were paralytic and a large proportion in 1944 were nonparalytic, the difference in intensity of the two epidemics is even greater than the gross figures would indicate.

As shown in table 1 and on the accompanying map, the incidence of poliomyelitis in 1944 was highest in the States of New York, Delaware, Kentucky, Virginia, North Carolina, Minnesota, and Maryland. Other areas where the incidence was above normal include the District of Columbia, Ohio, Michigan, Pennsylvania, and New Hampshire. Outbreaks involving small areas occurred in such States as Massachusetts, Wisconsin, Nebraska, and Oregon. There were also certain isolated counties in various parts of the country, with relatively high rates, which have small populations where one or two cases result in an unusually high incidence rate. Cities reporting a high incidence were numerous, as will be shown later.

The most extensive and intensive outbreak occurred in a solid block of counties in western and southern New York State and in a single tier of counties in northern Pennsylvania bordering on New York. The western part of Massachusetts where the incidence was high should also be included as part of this outbreak. One-third of all the cases reported in the United States in 1944 occurred in this area.

[1] All of the morbidity data for 1944 are provisional. The total number of cases reported by States and counties are the accumulated totals from monthly morbidity reports sent by States to the U. S. Public Health Service. Except in a few instances, cases among the military were excluded from the reports. These totals for States probably will be slightly different from the final reports which will appear as annual summaries in a supplement to the Public Health Reports. Morbidity rates by States and counties in this report are based on the estimated civilian populations as of November 1, 1943, Bureau of the Census—Special Report Series P–44, No. 3.

TABLE 1.—*Poliomyelitis morbidity rates per 100,000 population by States, 1940–44*

	1940	1941	1942	1943	1944
United States	7.4	6.8	3.2	9.8	14.9
New England:					
Maine	1.3	4.8	5.1	1.8	2.7
New Hampshire	.4	6.3	2.3	3.1	15.0
Vermont	1.7	3.9	9.1	8.8	13.0
Massachusetts	1.0	4.2	.9	6.1	10.8
Rhode Island	1.2	5.2	.7	27.2	1.6
Connecticut	1.1	6.7	2.8	21.6	12.5
Middle Atlantic:					
New York	1.6	8.2	2.1	5.4	49.8
New Jersey	1.5	8.4	6.1	2.1	13.3
Pennsylvania	1.7	7.4	1.2	1.3	15.6
East North Central:					
Ohio	9.5	7.0	2.3	2.7	17.4
Indiana	19.9	3.4	2.9	3.2	9.9
Illinois	7.6	4.8	6.2	20.8	7.3
Michigan	23.0	5.1	3.1	3.2	16.7
Wisconsin	15.7	3.1	1.4	7.0	9.5
West North Central:					
Minnesota	8.4	10.1	2.9	4.4	22.0
Iowa	36.9	1.7	2.9	8.9	8.9
Missouri	8.3	1.1	2.3	5.9	5.3
North Dakota	3.9	2.6	2.8	4.4	7.8
South Dakota	12.7	4.3	2.2	2.7	1.5
Nebraska	14.0	1.0	10.7	12.2	8.1
Kansas	30.1	2.7	6.1	45.3	6.7
South Atlantic:					
Delaware	.8	1.0	6.3	2.5	33.9
Maryland	.9	13.1	.8	1.2	22.0
District of Columbia	1.2	10.1	.6	1.4	21.5
Virginia	9.3	5.9	1.8	2.2	27.4
West Virginia	34.8	2.5	2.6	1.7	12.8
North Carolina	2.1	4.7	2.2	1.1	25.7
South Carolina	1.0	8.7	3.5	1.1	4.1
Georgia	.9	23.5	1.8	.9	3.3
Florida	1.7	14.4	2.2	1.4	5.3
East South Central:					
Kentucky	7.8	7.7	4.8	6.1	29.6
Tennessee	1.9	18.4	5.3	.6	4.6
Alabama	1.9	30.5	2.6	1.4	3.8
Mississippi	2.0	6.9	2.7	1.8	6.3
West South Central:					
Arkansas	1.5	3.0	7.8	4.4	2.5
Louisiana	5.5	2.9	2.4	3.1	6.7
Oklahoma	4.9	2.1	.7	30.0	2.6
Texas	2.7	2.0	3.8	20.3	5.8
Mountain:					
Montana	19.1	5.3	2.7	5.5	8.3
Idaho	13.0	1.9	1.1	3.2	2.7
Wyoming	16.3	4.7	6.0	13.1	3.4
Colorado	3.5	2.5	3.3	27.1	6.0
New Mexico	4.3	1.9	5.1	15.7	4.7
Arizona	1.4	3.0	6.8	24.0	5.8
Utah	11.3	7.4	5.0	68.3	4.2
Nevada	1.0	0	2.7	16.0	5.3
Pacific:					
Washington	24.6	4.1	1.8	18.4	10.4
Oregon	5.8	7.5	2.5	35.2	20.0
California	16.6	6.7	5.1	34.2	6.2

Based on the total number of cases reported, the intensity of the epidemic in this area was also by far the greatest for the country as a whole. In the group of counties comprising this area, 4 had rates in excess of 300 cases per 100,000 population, 3 had rates between 200 and 300, and in 11 counties the rates were between 100 and 200. The highest rate of incidence, 381 per 100,000 population, occurred in Steuben County, N. Y. Chemung and Schuyler Counties, which lie immediately east and adjacent to Steuben, also had rates in excess of 300. Tioga County, which lies just across the border in Pennsylvania, was the fourth county with a rate over 300. These 4 counties, which have a combined population of 196,500, reported 683 cases, or a

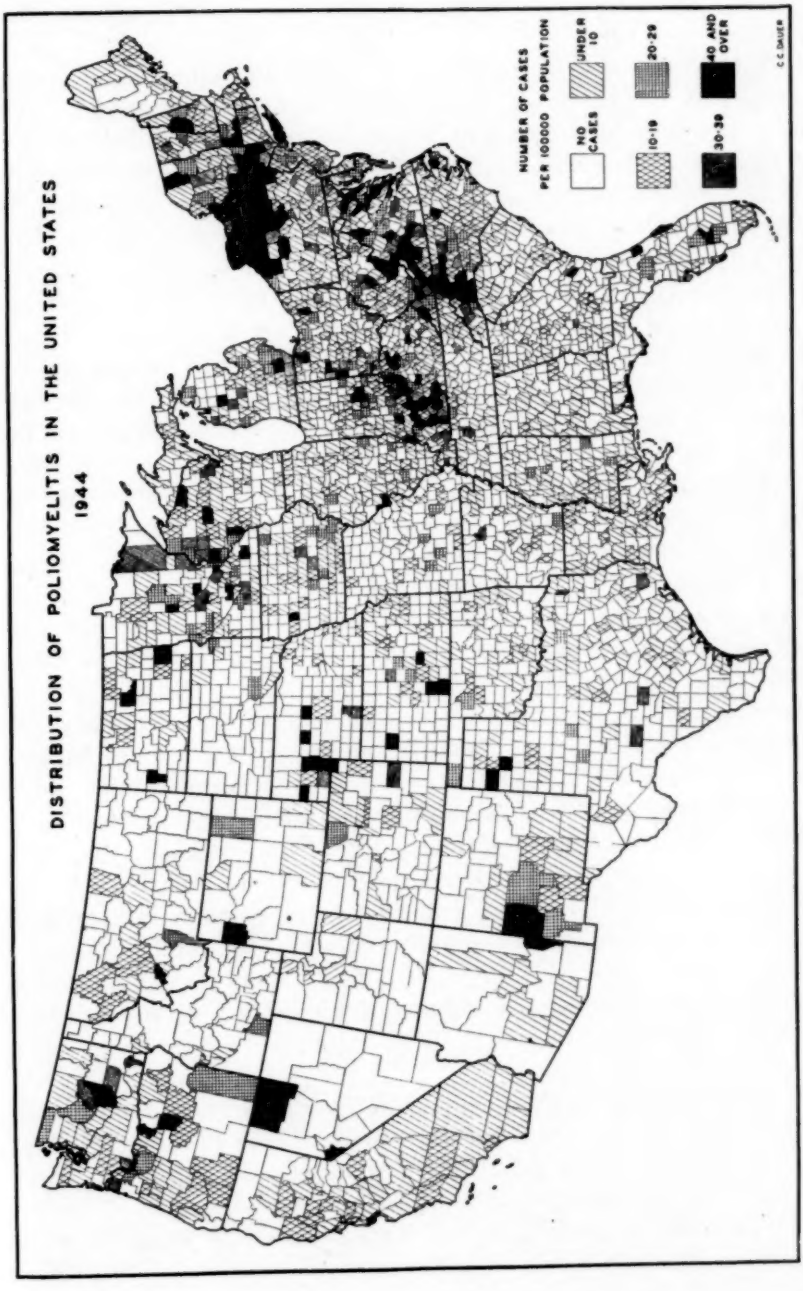
DISTRIBUTION OF POLIOMYELITIS IN THE UNITED STATES
1944
NUMBER OF CASES PER 100000 POPULATION
NO CASES
UNDER 10
10-19
20-29
30-39
40 AND OVER
C.C. DAILEY

FIGURE 1.

combined rate of 347 per 100,000 population. Excepting New York and Pennsylvania, of which these counties are a part, there were only 5 States which exceeded the total number of cases reported by these 4 counties.

Poliomyelitis cases appeared in Steuben and Chemung Counties late in June and the peak was reached by the first of August. The disease made its appearance at about the same time in Buffalo, i.e., late in June. The incidence in Buffalo (638 cases) and the remainder of Erie County (441 cases) was relatively high compared to many other large urban areas. The two areas, one consisting of the 4 counties described above and the other Buffalo and the contiguous area in Erie County, appeared to be the foci from which the disease spread to other parts of the States of New York and Pennsylvania.

In New York City the outbreak began during the second week of July and reached its peak during the last of August. Two previous epidemics in 1916 and 1931 began in Brooklyn but in 1944 it was first noted in the Bronx (*1*). During previous years when outbreaks occurred simultaneously in New York City and some other parts of New York State, the incidence was always higher in New York City. In 1916 the rates were 171 for New York City and 90 for up-State New York, in 1931 the rates were 59 and 36 respectively, and in 1935 they were 28 and 14. However, in 1944 the positions were reversed, up-State New York having a case rate of 75 and New York City a rate of 28.

Another area in which a relatively high incidence of poliomyelitis occurred in 1944 involved a group of counties in the eastern fringe of west central North Carolina, southwestern Virginia, and southeastern West Virginia. In North Carolina the disease was first noted in Caldwell County and soon thereafter in Catawba County. Before the end of June the epidemic had spread to nearby counties. In July cases began to be reported in relatively large numbers in a group of counties to the west across the Blue Ridge Mountains. The area where the first cases originated in North Carolina is connected by several main highways to the counties subsequently involved. These roads are used freely and frequently for family as well as commercial travel (*2*).

In southwestern Virginia a few scattered cases were reported late in June, and by the middle of July the outbreak had extended to a fairly large group of counties in the same general part of the State, and also to a few counties in southeastern West Virginia. The morbidity rates of the counties in North Carolina and Virginia where the epidemic occurred were much lower on the average than those in the New York-Pennsylvania area.

The incidence was also relatively high in a group of counties located in the eastern part of Virginia. The District of Columbia and the area

immediately surrounding it in Virginia and Maryland also experienced an outbreak of milder intensity than in the area already described. This was also the case in the city of Baltimore and the area contiguous to it, and throughout the State of Delaware.

A third fairly extensive area of relatively high incidence was located in north central and the western parts of Kentucky and in southern Indiana. During March, April, and May of 1944 sporadic cases of poliomyelitis were reported in Jefferson, Daviess, and Muhlenberg Counties in Kentucky. Jefferson County, in which Louisville is located, is about 125 miles northeast of Daviess and Muhlenberg Counties. The latter are separated by one intervening county. In June the number of cases reported increased rapidly in each of these three counties and they appear to have constituted the foci from which the epidemic spread to adjoining and other communities in the same parts of the State. Certain scattered counties in southern Indiana also reported a relatively high incidence of poliomyelitis. Many of these communities in Indiana have free communication by means of highways with Louisville where the disease first appeared (*2*).

Other smaller areas scattered throughout the country were involved in outbreaks of varying intensity which can be seen in figure 1. Certain details of one of these small outbreaks are worth reporting (*3*). Jersey County in west central Illinois, which has a population of about 13,000, had what amounted to an explosive outbreak limited to a period of 3 weeks. Twelve cases were reported among the residents of the county which gave a morbidity rate of 92 per 100,000 population. The first case reported had its onset on September 23 and the last case on the 16th of October. The first patient was 21 years old and had a brother and sister who attended school, the latter 2 having contact with 2 classmates who developed the disease, the onsets being reported as October 1 and 8, respectively. Two other patients worked together in a shoe factory. Only 2 of the 12 patients were under 10 years of age and 5 were over 20 years. Five of the patients lived in rural parts of the county and the remainder were residents of a town of 4,800 population. Two cases were nonparalytic, two had a bulbar type of paralysis, and the remainder had a "spinal" type of paralysis. During the 10-year period prior to 1944 single cases had been reported from this county during 4 separate years and 2 cases in another year.

Several communities in the Pacific States which were involved in the widespread outbreak in this area in 1943 again reported high rates of incidence in 1944. They were Kitsap and Clark Counties in the State of Washington, Multnomah in Oregon, and Santa Cruz County in California. The seasonal occurrence of cases in 1943 was not different from other years or for other counties in the same general areas during 1943, but sporadic cases kept occurring in these four

counties during the winter of 1943–44. In the summer of 1944 the disease was again prevalent, the seasonal occurrence being essentially the same as during the previous summer. Nearly all of the 1944 outbreak in Santa Cruz County was limited to the month of June, 12 cases being reported in that month. Kitsap and Clark Counties in Washington have had a 100-percent increase in population since 1940, and Multnomah a 30-percent increase, which may have had some influence in prolonging the high incidence of the disease over a period of 2 years.

Poliomyelitis has occurred in the armed forces of the United States more or less in proportion to the prevalence in the civilian population of similar ages. The incidence in the Army in the United States was 3.4 per 100,000 troops in 1943 and 4.0 in 1944. The case fatality rate in 1943 was 12.1 which is not inconsistent with certain data on civilian cases of similar ages. It is reported that there has been no concentration of cases at individual posts. Otherwise the disease was similar seasonally and geographically to that of civilian cases. The disease has also been reported among troops in service outside of the continental United States.

In certain respects the distribution of poliomyelitis in 1944 was similar to that in 1935 with respect to States involved. In 1935 North Carolina and Virginia had a fairly severe epidemic, and the disease was also unusually prevalent in New York State, in the New England States, and in Kentucky. However, in North Carolina only 3 of the 16 counties which had high rates (30 or more cases per 100,000 population) in 1935 were among the 21 having similarly high rates in 1944. The epidemic areas in this State for the 2 years overlapped to a very little extent. In Virginia 9 of the 25 counties involved in the 1935 outbreak were among the 30 with high rates in 1944. In New York State 40 counties, including New York City as a single unit, had high morbidity rates in 1944, and of these 9 were among the 12 with relatively high rates in 1935. In Kentucky the 1935 epidemic was localized to 7 counties and all of these were among the 31 counties involved in 1944. Hence, in these 4 States alone, of the 122 counties which had high morbidity rates in 1944 only 28 were among those with a high incidence in 1935, indicating only a limited amount of overlapping of the 2 epidemic areas.

When the total number of cases reported in the country as a whole is relatively large this fact is frequently taken to mean a fairly "severe" or widespread epidemic. However, the total number is not always closely related to the size or extent of the areas involved. For instance, in 1934 the disease was very widespread in the Pacific and certain Mountain States and 7,519 cases were reported for the country as a whole. In 1940 there was a large epidemic area extending across the northern part of the country west of the Appalachian

Mountains and a total of 9,826 cases was reported. In 1943 the disease was widespread again in the Pacific States and in southwestern United States and 12,450 cases were reported. On the other hand, in 1931, 1935, and 1944 the areas involved were much less extensive but 15,780, 10,671 and 19,053 cases, respectively, were recorded. It was during the 3 latter years that epidemics occurred in heavily populated States.

Another factor which influences the total number of poliomyelitis cases is the extent to which nonparalytic cases are included. If an outbreak occurs predominately in States which include a large percentage of nonparalytic cases in their reports, morbidity rates as well as total numbers of cases may be relatively high.

In order to demonstrate the wide variations in the proportion of paralytic and nonparalytic cases which are to be found in various parts of the country, or parts of the same State, the total number of cases reported, the number of nonparalytic cases, and the percentage of nonparalytic cases are listed in table 2 for certain cities and counties. All of these data have been obtained by request from health officers, or from official reports and unless otherwise stated include only resident cases. Several cities where the incidence was high were not included in the tabulation because complete data were not available. In previous epidemics the following cities and States likewise reported varying proportions of nonparalytic cases. Louisville reported 38 percent in 1935, New York City 33 percent of hospitalized cases in 1935, North Carolina 13 percent of cases investigated in 1935, Virginia 33 percent of cases investigated in 1935, Buffalo 36 percent in 1939, and Detroit 53 percent of cases reported from January 1 to September 30, 1939.

TABLE 2.—*Total number of cases reported, number of nonparalytic cases, and percent of nonparalytics for certain cities and counties, 1943 and 1944*

1943	Total cases reported	Number nonparalytic	Percent nonparalytic	1944	Total cases reported	Number nonparalytic	Percent nonparalytic
Sacramento, Calif.	101	66	64.3	Macomb County, Mich.	29	24	82.7
Kansas City, Mo.	71	42	59.1	Pontiac, Mich.	10	8	80.0
Wichita, Kans.	115	63	54.8	Washington, D. C.	194	84	43.3
Lane County, Oreg.	175	75	43.3	Detroit, Mich.	383	159	41.7
Chicago, Ill.	[1] 511	194	37.9	New York City	1882	750	39.8
New Haven, Conn.	103	38	36.9	Louisville, Ky.	191	68	35.6
Shreveport, La.	16	4	25.0	Syracuse, N. Y.	107	34	31.8
Los Angeles, Calif.	357	89	24.9	Norfolk, Va.	32	6	18.8
Dallas, Tex.	75	18	24.0	Baltimore, Md.	197	36	18.3
Providence, R. I.	80	14	17.5	Cleveland, Ohio [2]	280	40	14.3
Seattle, Wash.	69	7	10.1	Philadelphia, Pa [2]	300	35	11.6
San Diego, Calif.	86	1	1.2	Pittsburgh, Pa.	83	0	--------
Topeka, Kans.	20	0	--------	Roanoke, Va.	51	0	--------
Portland, Oreg.	64	0	--------				
Fall River, Mass.	17	0	--------				
Fort Worth, Tex.	103	0	--------				

[1] Hospitalized cases (total number of cases reported in Chicago in 1943 was 998).
[2] Includes nonresident cases.

There is no good reason for supposing that the percentage of the total cases that were nonparalytic should actually vary to the extent indicated by these data, i. e., from 0 to over 80 percent. The percentage probably depends more on local definitions or interpretations of a "case" of poliomyelitis.

If paralytic cases only were used as a basis for computing morbidity rates a much more accurate picture of the incidence in various counties, cities, and States could be obtained. For instance, 7 cities listed in the right hand column of table 2 have populations in excess of 500,000, namely, Washington, Detroit, New York, Baltimore, Cleveland, Philadelphia, and Pittsburgh. They had the following morbidity rates per 100,000 population in 1944, when based on all resident cases reported: 21.5, 20.7, 28.1, 20.1, 15.1, 13.4, and 12.3, respectively. It is apparent that the cities reporting a high percentage of nonparalytic cases had the highest gross morbidity rates. However, when the rates were based on the number of paralytic cases they were: 12.2, 12.2, 16.9, 16.6, 13.0, 11.8, and 12.3, respectively. This would suggest that the incidence was in reality about the same in all 7 cities, instead of varying from 12.3 to 28.1 cases per 100,000 population. Three other cities included in this part of the table, namely, Roanoke, Syracuse, and Louisville, would have the following rates when based on total cases reported: 79.4, 51.9, and 53.3, respectively; and when based on paralytic cases only: 79.4, 35.4, and 34.3. In each of these 3 cities the incidence may be regarded as having been relatively high in 1944.

These data indicate that incidence rates based on reported cases are not reliable indices for making accurate comparisons of prevalence in different areas or communities. At the present time they are merely useful in indicating where the incidence has been relatively high or low. It is obvious that there should be more uniformity in the reporting of poliomyelitis cases. It is desirable that monthly and annual reports submitted by States to the Public Health Service indicate separately the number of cases which are paralytic and nonparalytic. In the meantime, the total number reported appears to be the best available data for showing the geographical distribution of the disease. Nelson and Aycock (*4*) have recently pointed out another source of error in poliomyelitis morbidity data. They found that a comparatively large proportion (23 percent) of paralytic cases registered at the Harvard Infantile Paralysis Commission from 1928 to 1941 were not reported to the Massachusetts State Department of Health. To what extent nonreporting is present in other areas is unknown; nor is there any information as to whether there has been any improvement in reporting all paralytic poliomyelitis in recent years.

The occurrence of poliomyelitis in large cities has been striking

during the past 2 years. The 1940 census listed 37 cities with populations in excess of 250,000. Twelve of them had a high incidence of the disease in 1943 and 16 in 1944. In addition to these large cities 16 others with populations ranging from 100,000 to 250,000 had moderate or relatively severe outbreaks in 1943 or 1944. By way of contrast during 1934 and 1935 when poliomyelitis was prevalent in the same general areas as in 1943 and 1944, only 14 of the 92 cities of 100,000 population or more had outbreaks.

Occurrence of outbreaks in large cities rather than in rural areas was especially noticeable in Ohio and Minnesota in 1944. In Ohio two-thirds of all the cases reported occurred in 6 counties, all of which contain cities of 200,000 or more population. The combined rate for

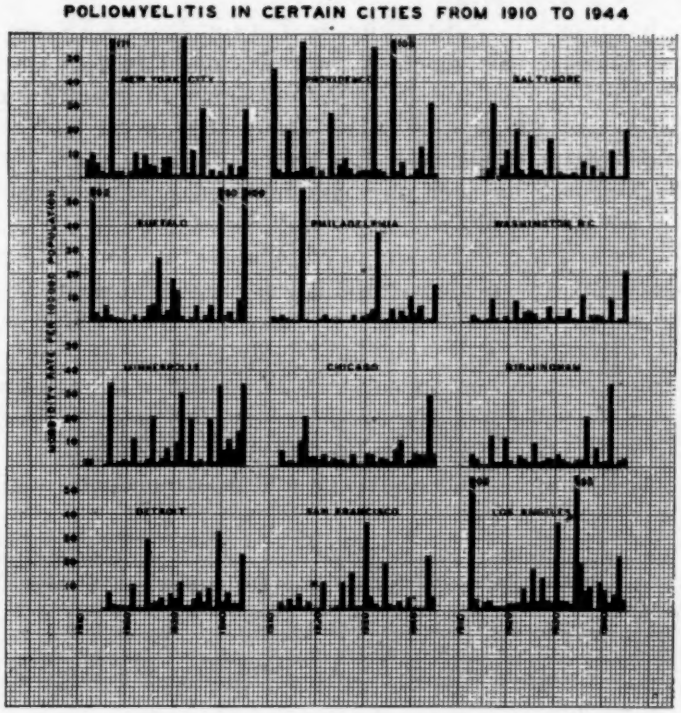

FIGURE 2.

the 6 counties was 23 per 100,000 population and for the remainder of the State it was 12. The 3 counties in Minnesota in which Minneapolis, St. Paul, and Duluth are located include 40 percent of the population of the State but accounted for 71 percent of all cases of poliomyelitis in 1944. The combined rate for the 3 counties was 39, and 11 for the remainder of the State.

There has been no regular occurrence or periodicity of outbreaks of poliomyelitis in cities of the United States during the past 3 decades, as shown in figure 2. The 12 cities were chosen arbitrarily because

data were available over a period of at least 30 years, and they are distributed throughout all parts of the country. The number of outbreaks has varied widely in this group of cities; Providence and Minneapolis have reported relatively high rates most frequently, and Chicago and Washington, D. C., most infrequently. Certain other cities not included in this illustration show similar variations, sometimes among cities of the same State. It has been suggested that the tendency toward more frequent occurrence in some communities is to be explained on the basis of reservoirs of infection such as carriers. Some environmental factor or factors of an unknown nature which lower nonspecific resistance to the disease in some communities has also been proposed as an explanation for more frequent occurrence of epidemics in some areas.

There has been no consistent interval of time between years of high incidence, the intervals generally varying from 4 to 15 years. New York City had an epidemic in 1907 (not shown in figure 2), a severe one in 1916, and others in 1931, 1935, and 1944, or at intervals of 9, 15, 4, and 9 years, respectively, the average being 9 years. In some cities the average number of years between epidemics was much smaller, for instance, in Providence and Minneapolis.

Relatively severe epidemics may be followed by a long interval with a comparatively low incidence. This was quite evident in New York City and Philadelphia following 1916, and in Chicago after the 1917 epidemic. However, this is not invariably the case as shown by the reported incidence in Los Angeles in 1934 and 1935, the rates being 95 and 20 per 100,000 population, respectively, for these 2 years. Outbreaks of milder intensity may occur 2 years in succession, such as occurred in Buffalo in 1929 and 1930, and in Minneapolis in 1943 and 1944.

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STUDIES OF THE ACUTE DIARRHEAL DISEASES

XV. THE AGGLUTINATION TEST IN *SHIGELLA PARADYSENTERIAE* INFECTIONS[1]

By JAMES WATT, *Surgeon*, and THELMA M. DECAPITO, *Junior Bacteriologist*, *United States Public Health Service*

The agglutination test has long been used in the study of *Shigella* infections but its reliability as a diagnostic test and its value as an index of immunity have been the subject of inconclusive debate.

[1] From the Division of Infectious Diseases, National Institute of Health.

Certain evidence relating to the question has been collected incidental to our studies of the acute diarrheal diseases and is herewith presented.

DESCRIPTION OF STUDY AND METHODS

Forty-five patients in a single ward of a mental hospital in Puerto Rico were placed under observation in October 1941. Stool cultures were obtained daily by rectal swabs for 6 months and twice a week for the remainder of the year. Insofar as possible the same patients were studied for the entire year but replacements were necessitated by discharges, deaths, and transferral of patients to special quarters.

Bloods for agglutination tests were obtained three times—5, 10, and 12 months after the beginning of the study. The serums were removed, kept tightly corked at 4° C., and tested within a week. Any "repeat tests" were performed within 1 month.

Macroscopic agglutination tests (100- x 13-mm. tubes) were employed in serial dilutions from 1:20 to 1:1,280. Positive and negative controls were employed. Serums reacting to 1:640 or above were retested with the same and higher dilutions. A preliminary screening test was used in the first series of tests only; here all serums with partial or complete agglutination in 1:20 dilution were titrated.

The strains of *Shigella paradysenteriae* used in the preparation of antigens for these tests were obtained from the following sources:

Flexner V, W, and Z	Standards Laboratory, Oxford, England.
Flexner V, W, and Z	Strains isolated from patients in the institution in which study was conducted.
Sonne	Strains isolated locally.
Newcastle	
Schmitz	

All strains used for antigen preparation were repeatedly subcultured and colonies were examined under magnification for smoothness. Organisms used for seed cultures were obtained from plates showing uniformly smooth growth and were inoculated to beef infusion agar. After incubation for 24 hours the growth was washed off with formalized (0.5 percent) saline. Antigen was prepared with the Oxford strains on one occasion only and a portion of the same supply was used on each of two tests; that with the locally isolated strains was freshly prepared for each of the three series of tests. All antigens were tested against one lot of homologous rabbit antiserums and were used only when the titre closely approximated the accepted titre of the serum.

Further to assure uniformity of results, the following precautions were taken: Serum from each individual sufficient for tests with all antigens was diluted at one time. The antigens were also standardized by turbidity (McFarland nephelometer No. 3) in a volume adequate for all tests. Employing the serial dilutions of serum mixed with

equal quantities of antigen, the tests were shaken, incubated at 56° C. for 4 hours, and left at room temperature overnight. All readings were made by the same individual. The presence of complete or partial macroscopic agglutination was recorded.

OBSERVATIONS

(*a*) Shigella paradysenteriae *Flexner infections.*—A diagnostic agglutination test is employed, usually within the first month following suspected infection. Results of serological and cultural tests on individuals who had been under observation for the month immediately preceding each bleeding are shown in table 1. There were 132 person months of observation (1 person observed for the 1 month preceding an agglutination test) and Flexner V was found during 37 (25 percent), Flexner W during 25 (19 percent), and Flexner Z during 8 (6 percent) person months. Considering each variety separately it was found that a larger proportion of those found positive by culture showed agglutinins for the respective types than did those with negative cultural findings. It should be noted, however, that 23 tests on individuals

TABLE 1.—*Observed maximum titre in 132 agglutination tests by specific antigens and by stool culture results for homologous Flexner type during 1 month prior to the test*

Antigen	Culture results	Total tests	Maximum agglutination titre by individuals								
			No agglutinins	Total with agglutinins	20	40	80	160	320	640	1,280
V	Positive	37	10	27	8	7	6	3	1	2	0
	Negative	95	31	64	39	18	3	2	0	2	0
W	Positive	25	12	13	8	3	2	0	0	0	0
	Negative	107	54	53	35	13	3	1	0	1	0
Z	Positive	8	1	7	0	4	3	0	0	0	0
	Negative	124	72	52	37	11	2	1	1	0	0
Total all antigens:											
Number	Positive	70	23	47	16	14	11	3	1	2	0
	Negative	326	157	169	111	42	8	4	1	3	0
Percent	Positive	------	32.8	67.2	22.8	20.0	15.7	4.3	1.4	2.9	------
	Negative	------	48.3	51.7	34.0	12.9	2.5	1.2	.3	.9	------

known to have positive stool cultures within the preceding month failed to show any agglutinins in a 1:20 dilution of serum or higher. In 15 of these cases the type strains were demonstrated in stool cultures repeatedly throughout the month and the average duration of known infection in the other 7 was 10 days. Conversely agglutinins were found in 169 tests on serums from individuals with negative stool cultures.

The knowledge that there have been consistently negative stool cultures for 1 month does not exclude the possibility of an earlier infection being responsible for the presence of specific agglutinins in an individual. Excluding from consideration those who were examined

culturally for less than 3 months, there were 32 persons tested at the end of the twelfth month of the study who had been under observation an average of 11.5 months before bleeding. Likewise, for the 2 earlier examinations there were at the tenth month 38 individuals under observation for an average of 9.8 months, and at the fifth month 42 with an average of 4.7 months of observation. The serological and bacteriological findings for these groups, as shown in table 2, were very similar to those found when the shorter observation was employed (table 1). Although individuals with positive cultures were more frequently found to have agglutinins, still this was true chiefly in serum dilutions of 1:80 or lower, and exceptions were common.

TABLE 2.—*Agglutinin titres of individual serums at different test periods according to type of antigen employed and detected infection with homologous types of* Shigella paradysenteriae *Flexner*

Antigen	Stool culture result, homologous type	Total tests	Agglutination titre by individuals								
			No agglutinins	Total with agglutinins	20	40	80	160	320	640	1,280
Flexner V	+Preceding 5 months	15	9	6	3	2	0	1	0	0	0
	+Preceding 10 months	26	2	24	10	4	5	4	0	1	0
	+Preceding 12 months	23	4	19	10	5	2	0	1	1	0
	−Preceding 5 months	27	15	12	8	3	1	0	0	0	0
	−Preceding 10 months	12	2	10	5	3	1	0	0	1	0
	−Preceding 12 months	9	3	6	2	3	0	0	0	1	0
Flexner W	+Preceding 5 months	17	6	11	6	3	2	0	0	0	0
	+Preceding 10 months	24	5	19	9	7	2	1	0	0	0
	+Preceding 12 months	23	12	11	7	4	0	0	0	0	0
	−Preceding 5 months	25	18	7	3	1	2	0	1	0	0
	−Preceding 10 months	14	7	7	5	1	0	0	0	1	0
	−Preceding 12 months	9	6	3	2	1	0	0	0	0	0
Flexner Z	+Preceding 5 months	6	1	5	0	3	2	0	0	0	0
	+Preceding 10 months	4	1	3	3	0	0	0	0	0	0
	+Preceding 12 months	7	3	4	2	1	1	0	0	0	0
	−Preceding 5 months	36	21	15	9	5	1	0	0	0	0
	−Preceding 10 months	34	21	13	11	2	0	0	0	0	0
	−Preceding 12 months	35	12	23	7	4	1	1	0	0	0
All antigens: All periods	Number positive	145	43	102	50	29	14	6	1	2	0
	Number negative	192	105	87	52	23	6	2	1	3	0
	Percent positive	------	29.7	70.3	34.5	20.0	9.7	4.1	.7	1.4	0
	Percent negative	------	54.7	45.3	27.1	12.0	3.1	1.0	.5	1.6	0

The relation of diarrheal disease as well as positive stool cultures to the presence of agglutinins is considered in table 3. Here the analysis is by "person periods," relating to the status of the stool cultures and the presence or absence of diarrhea during the total period prior to an agglutination test. Since the reactions against each of the three Flexner antigens were tested separately each "person period" is counted three times. Three groups are shown: (*a*) Those who had positive cultures and reported diarrheal disease during the period prior to an agglutination test, (*b*) those with positive stool cultures but no reported

TABLE 3.—*Agglutinin titres in serums of individuals according to stool culture results and reported history of diarrhea*

Stool culture results and clinical history	Total tests	Agglutination titre by individuals								
		No agglutinins	Total with agglutinins	20	40	80	160	320	640	1,280
Number										
Positive with diarrhea	63	32	31	17	8	5	1	0	0	0
Positive without diarrhea	132	51	81	45	23	7	3	1	2	0
Negative [1] without diarrhea	57	36	21	9	4	4	0	1	3	0
Percent										
Positive with diarrhea	100	50.7	49.3	27.0	12.7	8.0	1.6	.0	.0	.0
Positive without diarrhea	100	38.6	61.4	34.1	17.4	5.3	2.3	.8	1.5	.0
Negative [1] without diarrhea	100	63.1	36.9	15.8	7.0	7.0	.0	1.8	5.3	.0

[1] The number of individuals with diarrhea and negative stools was too small for inclusion in this analysis

diarrhea during the period, and (*c*) individuals who had negative stool cultures and no reported diarrhea throughout the periods of observation. All individuals in this last group were under observation a minimum of 10 months. The number with diarrheal disease and negative cultures was too small to include in this analysis. The similarity of agglutinin titres found in the various groups and between these and the two preceding tabulations is striking. There is no indication that infection with symptoms stimulated agglutinin production to any greater extent than infection without symptoms.

Our data were also examined for evidence of titre change with and without the occurrence of demonstrated infection. As previously stated antigen adequate for two series of tests was prepared from the stock Oxford strains. Using the results obtained with these antigens in the tenth month as a base line or norm, the results of the test 2 months later according to titre change and bacteriological findings are shown in table 4, A and B. All detected changes are

TABLE 4.—*Comparison of titres obtained after 2-month interval according to stool culture result for homologous type*

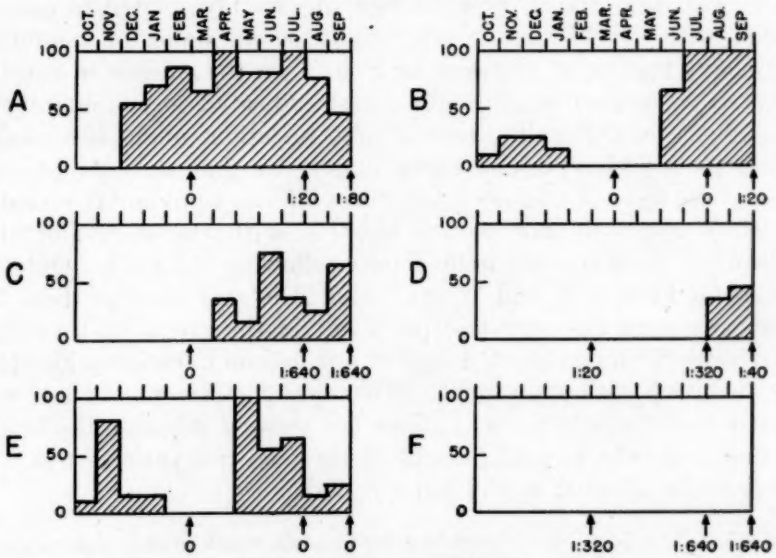
[A. By any observed titre change. B. By titre change of 2 or more dilutions]

Culture results for homologous type	Higher titre		No change		Lower titre		Total
	Number	Percent	Number	Percent	Number	Percent	
A. Any titre change							
Positive	17	39	10	23	17	39	44
Negative	25	36	30	43	15	21	70
B. Change of two or more dilutions							
Positive	9	20	32	73	3	7	44
Negative	11	16	55	79	4	6	70

shown in part A, but in part B only changes of two dilutions or more are recorded. In part B the titre change in the negative group was similar to that found for those with positive cultures. Moreover, significant titre decrease was noted in the presence of detected infection.

It is evident that a positive agglutination test did not reliably indicate the presence of culturally demonstrable *Shigella* infection. Furthermore, there was no constant or prominent change in titre which could be related to the presence or absence of infection. Figure 1 illustrates the types of variation seen in individual cases. The

GRAPHIC REPRESENTATION OF INDIVIDUAL SAMPLE CASES SHOWING PERCENTAGE OF STOOLS FOUND POSITIVE BY MONTHS AND OBSERVED AGGLUTININ TITRE



1. CROSS-HATCHED AREA REPRESENTS PERCENTAGE OF STOOLS FOUND POSITIVE
2. ARROWS INDICATE DATES SERUM OBTAINED AND TITRE AT THAT TIME

FIGURE 1.

rectangular area represents the total number of cultures taken during the year and the proportion found positive for a single variety of Flexner is shown by the cross-hatched area. The agglutinin titre at the various test periods is indicated by the arrows. Though these cases have been selected to illustrate the variability of this test they are not isolated examples of any of the different types of reaction seen.

The same cultural method was employed throughout the study and, since all workers were trained at the beginning, the method was subjected to a minimum of variation. Hence detected prevalence in one period should be comparable to any other period and presumably in the same ratio to true prevalence in these periods. If

agglutinins are produced in response to the stimulus of infection they too should have comparable ratios by periods with the detected prevalence. This was not found. In the case of Flexner V infection, 4 percent of the stools were positive during the first 5 months, 10 percent in the second 5 months, and 16 percent during the last 2 months of the study. The detected agglutinins for the group did not show a corresponding increase in each period. For Flexner W infection the percentages positive by periods were 8, 6, and 13, and for Flexner Z, 1, 1, and 3. If these figures are compared with the titres shown in table 3 it is at once apparent that there is no consistent relationship between the detected prevalence of infection in the group and the level of agglutinin titres for the corresponding antigen.

Detected agglutinins, even though uncertainly related to past infection with the Flexner group, might be an index of immunity. They have been used at times as a check on the efficacy of vaccination. If a positive agglutination test indicated any immunity to infection fewer culturally demonstrated infections might be expected among those with a positive agglutination test than among those with a negative test. In table 5 the titres of the individuals tested in February and July are shown, together with the results of stool culture for the 2 months immediately following the tests. Only the results for Flexner V and W are included in this table as these two organisms were the only two prevalent in the group at that time. Individuals with no detected agglutinins had no more infections than did the group with agglutinins. Twenty-eight percent of those with negative reactions to the agglutinin test showed infection in the succeeding 2 months and 27 percent of those with a positive test were found to be infected in the same period.

TABLE 5.—*Titre found on 152 agglutination tests and results of stool cultures during 2 months subsequent to test*

Preceding observed titre	Cultural results in succeeding 2 months								
	Flexner V			Flexner W			Total		
	Number of tests	Positive		Number of tests	Positive		Number of tests	Positive	
		Number	Percent		Number	Percent		Number	Percent
No agglutination	27	9	33	37	9	24	64	18	28
1:20	24	6	25	20	4	20	44	10	23
1:40	12	2	17	13	5	38	25	7	28
1:80	6	3	50	3	1	33	9	4	44
1:160	5	2	40	1	0	--------	6	2	33
1:320	0	0	--------	1	0	--------	1	0	--------
1:640	2	1	50	1	0	--------	3	1	33
1:1,280	0	0	--------	0	0	--------	0	0	--------
Total with agglutination	49	14	29	39	10	26	88	24	27

(*b*) Shigella paradysenteriae *Newcastle, Schmitz, and Sonne infections.*—Other members of the *Shigella* group were isolated from these patients. Newcastle dysentery bacilli were found during the first 5 months of the study and Schmitz bacilli were isolated throughout the study period.

Agglutination tests using Newcastle antigen were done at each period. Of the 42 individuals tested in February, 10 had been found infected with this organism. Nine of these did not show any agglutinins when tested; 1 was positive in a dilution of 1:20. Of the 32 patients with negative stools, 2 were positive in a dilution of 1:20, the others were negative. Although this organism was not found in the group at any time after the first test, 8 people showed agglutinins on the second test, 2 in previously culturally positive individuals, and 6 in negative patients. No titres were higher than a dilution of 1:80. On the third test 2 months later, no agglutination was obtained in any serum.

Schmitz bacillus was commonly encountered during the entire study period. Serums were tested against Schmitz antigen only twice. Of 21 individuals found positive for this organism, only 3 had serums showing a positive reaction and the highest titre was in the 1:40 dilution. Of 21 individuals not found to be positive, 2 showed agglutinins up to a 1:40 dilution.

Shigella paradysenteriae Sonne was not found in this group but, because it is a very common cause of diarrheal disease, all serums were tested against this antigen. In February no positives were found. In July five persons showed agglutination in a dilution of 1:20. In September also five persons gave positive agglutinin tests, one at a titre of 1:1,280, another 1:640, another 1:320, and the other two 1:40. The patient with the highest titre had not had any diarrheal disease during the preceding 12 months, nor had any *Shigellae* been found in his stool specimens.

SUMMARY

A group of 45 patients in a mental hospital were kept under observation for 1 year. They were watched for diarrheal disorders during this period. For the first 6 months stool cultures were made daily and for the next 6 months, twice weekly.

Blood was obtained after observation for periods of 5, 10, and 12 months and agglutination tests were performed on the serums. Standardized suspensions of *Shigella paradysenteriae* Flexner V, W, and Z, Newcastle, Schmitz, and Sonne were employed as antigens in the tests. The technique was standardized throughout and positive and negative controls were used.

Agglutinins against all of the Flexner antigens were commonly

demonstrated in the group. When these were compared with the results of stool cultures it was apparent that, although individuals found to be positive showed a definite tendency to have higher agglutinin titres, these were neither sufficiently high nor consistent to permit interpretation of individual results. Examination using the same antigen, repeated at intervals, also failed to provide a reliable means of interpretation. The presence of diarrheal disease associated with positive cultures did not show any different picture. Significant change in titre was not observed consistently in the presence of known infection. There was no apparent relation between the titre level of the group and prevalence of infection. Persons with a positive agglutination test were just as likely to have positive stool cultures after the test as those with no agglutinins.

The evidence with Newcastle, Schmitz, and Sonne is not as complete but it is apparent that infection with the first two of these organisms did not cause the production of agglutinins in high titre and that such agglutinins may be present in the absence of detectable infection. The serums of several individuals agglutinated the Sonne antigen although cultures were negative in all cases examined.

CONCLUSION

The agglutination test as performed did not provide a reliable means of diagnosing past infection with any of the members of the *Shigella* group studied; nor did it provide any index of immunity or susceptibility in the case of the Flexner organisms.

DEATHS DURING WEEK ENDED MAY 12, 1945

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 12, 1945	Corresponding week, 1944
Data for 93 large cities of the United States:		
Total deaths	9,147	9,098
Average for 3 prior years	8,967	
Total deaths, first 19 weeks of year	180,799	187,782
Deaths under 1 year of age	572	588
Average for 3 prior years	598	
Deaths under 1 year of age, first 19 weeks of year	11,931	11,946
Data from industrial insurance companies:		
Policies in force	67,289,103	66,523,136
Number of death claims	12,024	12,347
Death claims per 1,000 policies in force, annual rate	9.3	9.7
Death claims per 1,000 policies, first 19 weeks of year, annual rate	11.0	10.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 19, 1945

Summary

Of the total of 47 cases of poliomyelitis reported for the week, as compared with 33 last week, 36 for the corresponding week last year, and 26 for the 5-year (1940–44) median, 24 occurred in Texas (3 cases last week), 6 in New York, and 4 each in Ohio and South Carolina. The total to date this year is 690 cases, as compared with 460 for the same period last year. Up to May 12 this year, 25 counties in Texas had reported 54 cases, approximately half of which occurred in 3 widely separated counties—Hidalgo 12, Harris and Haskell 7 each.

A total of 174 cases of meningococcus meningitis was reported, as compared with 170 last week and 81 for the 5-year median. The cumulative total to date is 4,509 cases, as compared with 10,270 for the same period last year and a 5-year median of 1,567.

Of the total of 5,013 cases of measles, as compared with 4,636 last week and 22,881 for the 5-year median, 1,451 occurred in California. The total for the year to date is 64,136, as compared with 503,565 for the same period last year, and a 5-year median of 396,365.

Cumulative figures for certain other diseases for the first 20 weeks of the year (last year's figures in parentheses) are as follows: Anthrax 16 (17), diphtheria, 5,537 (4,575), dysentery, all forms, 11,386 (6,816), infectious encephalitis 133 (215), influenza 61,397 (331,657), leprosy 16 (13), Rocky Mountain spotted fever 42 (30), scarlet fever 108,126 (123,874), smallpox 210 (234), tularemia 317 (211), typhoid and paratyphoid fever 1,184 (1,490), endemic typhus fever 1,002 (878), whooping cough 49,852 (35,975), undulant fever 1,760 (1,160).

A total of 9,097 deaths was recorded for the week in 92 large cities of the United States, as compared with 9,027 last week, 8,816 for the corresponding week last year, and a 3-year (1942–44) average of 8,652. The cumulative total is 187,832, as compared with 194,523 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended May 19, 1945, and comparison with corresponding week of 1944, and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	May 19, 1945	May 20, 1944		May 19, 1945	May 20, 1944		May 19. 1945	May 20, 1944		May 19, 1945	May 20, 1944	
NEW ENGLAND												
Maine	0	1	0	-------	2	-------	3	239	141	0	0	0
New Hampshire	0	0	0	-------	-------	-------	0	20	40	1	0	0
Vermont	0	0	0	-------	-------	-------	9	66	66	1	0	0
Massachusetts	2	6	5	-------	-------	-------	190	944	1,053	3	7	7
Rhode Island	0	1	0	-------	10	-------	1	44	44	0	1	0
Connecticut	1	0	0	2	2	-------	144	554	467	2	9	2
MIDDLE ATLANTIC												
New York	13	13	16	[1] 1	[1] 3	[1] 4	112	1,316	1,316	26	47	20
New Jersey	1	1	4	5	1	5	66	1,261	1,261	11	10	6
Pennsylvania	7	10	11	3	3	-------	445	675	1,591	8	36	11
EAST NORTH CENTRAL												
Ohio	2	5	7	4	12	12	96	316	469	13	21	3
Indiana	1	5	3	6	-------	1	[3] 46	103	103	[3] 2	3	1
Illinois	11	17	17	2	9	6	275	536	536	14	36	0
Michigan [3]	6	9	5	3	1	2	339	661	802	6	27	1
Wisconsin	3	0	1	46	31	31	53	2,271	2,021	4	8	3
WEST NORTH CENTRAL												
Minnesota	3	3	3	2	-------	1	4	388	388	2	11	1
Iowa	0	5	3	-------	2	2	56	185	205	2	8	2
Missouri	4	1	3	1	1	1	36	201	247	2	19	1
North Dakota	3	0	1	1	-------	-------	3	68	67	0	3	0
South Dakota	1	2	1	-------	-------	-------	35	21	21	0	0	0
Nebraska	3	3	1	9	2	1	56	320	195	0	2	0
Kansas	9	5	2	-------	2	2	44	352	453	2	8	1
SOUTH ATLANTIC												
Delaware	1	0	0	-------	-------	-------	1	46	46	1	0	0
Maryland [1]	13	14	6	1	1	3	51	420	369	6	8	7
District of Columbia	2	0	0	-------	3	1	11	178	119	0	3	2
Virginia	5	2	4	103	53	106	45	601	376	1	8	6
West Virginia	0	4	7	6	-------	4	43	257	97	1	5	1
North Carolina	10	8	6	-------	-------	4	103	1,024	402	2	6	1
South Carolina	6	4	5	168	175	188	29	270	213	2	2	0
Georgia	2	6	3	6	8	18	6	126	109	1	3	1
Florida	4	3	3	1	3	3	8	154	93	5	5	1
EAST SOUTH CENTRAL												
Kentucky	0	1	3	1	8	8	24	119	152	3	9	2
Tennessee	3	0	2	7	15	21	79	111	166	6	6	3
Alabama	5	1	1	20	23	53	20	201	114	8	7	2
Mississippi [2]	3	5	3	-------	-------	-------	-------	-------	-------	0	6	4
WEST SOUTH CENTRAL												
Arkansas	0	2	3	25	17	17	28	112	112	3	0	0
Louisiana	3	4	4	14	2	4	25	76	52	2	12	2
Oklahoma	1	4	3	11	53	28	24	369	74	1	0	0
Texas	32	23	22	546	305	305	422	2,664	1,146	6	21	4
MOUNTAIN												
Montana	0	1	0	2	6	6	8	118	113	0	0	0
Idaho	0	0	0	1	-------	-------	2	9	19	0	0	0
Wyoming	0	1	0	-------	-------	1	7	51	51	0	1	0
Colorado	8	6	6	4	14	14	16	315	315	1	2	0
New Mexico	4	5	1	-------	4	2	10	122	99	0	0	0
Arizona	0	3	2	54	48	61	23	116	125	0	0	0
Utah [2]	0	0	0	3	-------	6	253	42	98	0	1	0
Nevada	0	3	0	-------	-------	-------	5	11	2	0	0	0
PACIFIC												
Washington	4	2	2	-------	5	2	212	342	386	5	2	2
Oregon	3	0	2	11	15	15	94	115	197	2	3	1
California	22	18	16	5	61	53	1,451	4,371	1,053	19	19	4
Total	201	207	194	1,074	900	1,124	5,013	22,881	22,881	174	385	81
20 weeks	5,537	4,575	5,439	61,397	331,657	163,176	[3] 64,136	503,565	396,365	[3] 4,509	10,270	1,567

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Delayed reports, Indiana: Measles 14, meningococcus meningitis 2.

Telegraphic morbidity reports from State health officers for the week ended May 19, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	May 19, 1945	May 20, 1944		May 19, 1945	May 20, 1944		May 19, 1945	May 20, 1944		May 19, 1945	May 20, 1944	
NEW ENGLAND												
Maine	0	1	0	44	57	16	0	0	0	0	1	0
New Hampshire	0	0	0	6	6	4	0	0	0	0	0	0
Vermont	0	0	0	8	11	11	0	0	0	0	0	0
Massachusetts	0	0	0	357	377	256	0	0	0	1	4	3
Rhode Island	0	1	0	15	11	19	0	0	0	0	0	0
Connecticut	0	0	0	56	85	85	0	0	0	1	1	0
MIDDLE ATLANTIC												
New York	6	2	0	567	470	488	0	0	0	4	3	9
New Jersey	0	1	1	146	262	262	0	0	0	2	1	1
Pennsylvania	0	1	1	607	486	388	0	0	0	8	2	4
EAST NORTH CENTRAL												
Ohio	4	1	0	364	453	231	1	1	0	3	4	4
Indiana	[3] 0	1	0	[3] 75	106	82	1	2	1	0	1	1
Illinois	0	1	1	258	391	298	0	1	1	2	1	2
Michigan [3]	0	0	0	256	304	255	0	0	0	3	2	3
Wisconsin	0	0	0	203	269	130	0	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota	0	1	0	95	130	69	0	0	0	0	0	0
Iowa	0	0	0	44	137	41	0	0	0	0	0	0
Missouri	0	0	0	68	97	52	0	0	0	2	0	0
North Dakota	0	0	0	34	26	6	1	0	0	1	0	0
South Dakota	0	0	0	24	23	14	0	0	0	0	0	0
Nebraska	0	0	0	95	64	11	0	1	0	0	0	0
Kansas	0	0	0	51	70	47	0	1	1	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	8	6	6	0	0	0	1	0	0
Maryland [3]	1	0	0	155	204	71	0	0	0	2	0	0
District of Columbia	0	0	0	34	96	12	0	0	0	0	1	0
Virginia	0	0	1	66	46	31	0	0	0	1	6	4
West Virginia	1	0	0	56	121	38	0	0	0	1	2	2
North Carolina	0	0	0	65	27	21	0	0	0	2	6	1
South Carolina	4	3	1	14	8	2	0	0	0	2	5	1
Georgia	0	1	0	31	30	16	0	0	1	1	6	5
Florida	0	0	0	8	3	3	0	0	0	1	1	4
EAST SOUTH CENTRAL												
Kentucky	1	0	1	52	53	49	0	0	0	6	7	5
Tennessee	0	0	0	46	59	43	1	0	1	4	6	5
Alabama	2	0	0	19	9	9	0	2	0	1	3	3
Mississippi [3]	0	1	1	18	6	6	0	1	1	0	4	1
WEST SOUTH CENTRAL												
Arkansas	0	0	0	8	4	3	1	0	1	1	2	2
Louisiana	1	7	1	7	7	7	0	0	0	1	9	7
Oklahoma	2	0	0	13	42	10	1	0	0	0	0	2
Texas	24	4	1	70	52	33	0	0	1	8	11	10
MOUNTAIN												
Montana	0	0	0	31	41	15	0	0	0	3	0	0
Idaho	0	0	0	13	14	10	0	0	0	1	0	0
Wyoming	0	0	0	7	16	11	0	0	0	0	1	0
Colorado	0	0	0	56	60	38	0	0	1	0	0	1
New Mexico	0	0	0	20	21	2	1	0	0	0	0	1
Arizona	0	1	1	36	26	8	0	0	0	2	1	1
Utah [3]	0	0	0	15	70	20	0	0	0	0	0	0
Nevada	0	0	0	0	1	0	0	0	0	0	0	0
PACIFIC												
Washington	1	1	1	65	221	30	0	0	0	1	2	1
Oregon	0	0	0	17	95	8	0	0	1	1	0	0
California	0	8	4	349	252	134	0	1	0	3	21	5
Total	47	36	26	4,652	5,425	3,686	7	10	18	70	114	98
20 weeks	[5] 690	460	460	[5] 108,126	123,874	79,410	210	234	517	1,184	1,490	1,582

[3] Period ended earlier than Saturday.
[4] Including paratyphoid fever reported separately as follows: Massachusetts 1; New York 1; Texas 2.
[5] Delayed reports, Indiana: Poliomyelitis 1, scarlet fever 59.

Telegraphic morbidity reports from State health officers for the week ended May 19, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Whooping cough			Week ended May 19, 1945							
	Week ended—		Median 1940–44	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever	Undulant fever
	May 19, 1945	May 20, 1944		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	55	0	22	0	0	0	0	0	0	0	4
New Hampshire	4	0	1	0	0	0	0	0	0	0	0
Vermont	35	0	23	0	0	0	0	0	0	0	2
Massachusetts	162	66	176	0	0	0	0	0	0	0	0
Rhode Island	11	15	29	0	0	0	0	0	0	0	0
Connecticut	56	35	74	0	0	0	0	0	0	0	4
MIDDLE ATLANTIC											
New York	213	151	260	5	13	0	1	0	0	0	5
New Jersey	136	46	134	0	0	0	0	0	0	0	4
Pennsylvania	186	50	231	0	0	0	0	0	0	0	3
EAST NORTH CENTRAL											
Ohio	144	73	201	0	0	0	0	0	0	0	0
Indiana	13	12	35	1	0	0	0	0	0	0	1
Illinois	40	42	108	1	1	0	1	1	0	0	9
Michigan [2]	71	83	233	0	1	0	0	0	0	0	14
Wisconsin	27	49	135	0	0	0	0	0	0	0	12
WEST NORTH CENTRAL											
Minnesota	7	10	51	1	0	0	0	0	0	0	5
Iowa	7	13	30	0	0	0	0	0	0	0	0
Missouri	36	15	19	0	0	0	0	0	0	0	1
North Dakota	1	0	4	0	0	0	0	0	0	0	0
South Dakota	0	4	2	0	0	0	0	0	0	0	1
Nebraska	1	3	8	0	0	0	0	0	0	0	1
Kansas	14	46	46	0	0	0	0	0	1	0	1
SOUTH ATLANTIC											
Delaware	3	0	3	0	0	0	0	0	0	0	0
Maryland [2]	59	49	77	0	0	0	0	2	0	0	1
District of Columbia	8	8	9	0	0	0	0	0	0	0	0
Virginia	63	47	96	0	0	20	0	2	3	0	0
West Virginia	7	7	50	0	0	0	0	0	0	0	0
North Carolina	155	110	112	0	0	0	1	2	2	[3] 5	0
South Carolina	108	105	105	10	47	0	0	2	0	2	0
Georgia	7	9	28	0	1	7	0	0	2	9	6
Florida	6	22	13	2	3	0	0	0	0	18	0
EAST SOUTH CENTRAL											
Kentucky	38	62	67	1	0	0	0	0	0	0	0
Tennessee	20	30	45	0	0	2	0	0	1	0	0
Alabama	32	22	51	0	0	0	0	0	0	6	2
Mississippi [2]				0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL											
Arkansas	8	22	22	1	3	0	0	0	2	0	0
Louisiana	10	4	14	1	0	0	1	0	2	1	0
Oklahoma	19	3	26	0	0	0	0	0	0	0	1
Texas	247	288	309	6	307	43	0	0	1	29	22
MOUNTAIN											
Montana	2	4	13	0	0	0	0	0	0	0	2
Idaho	4	0	5	0	0	0	0	0	0	0	2
Wyoming	3	2	3	0	0	0	0	1	0	0	0
Colorado	34	34	30	0	0	0	0	0	0	0	0
New Mexico	3	5	23	0	1	0	0	0	0	0	0
Arizona	28	9	18	3	0	23	0	0	0	0	0
Utah [2]	53	69	69	0	0	0	0	0	1	0	5
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	20	15	43	0	0	1	0	0	0	0	1
Oregon	21	10	10	0	0	0	0	0	0	0	2
California	373	112	501	0	5	0	0	0	0	0	7
Total	2,550	1,761	3,767	32	382	96	4	10	15	70	118
Same week 1944	1,761			23	449	128	7	9	12	86	58
Average, 1942–44	3,286			28	321	112	9	[4] 13	25	[4] 35	
20 weeks, 1945	49,852			595	8,504	2,287	133	42	317	[3] 1,002	1,760
1944	35,975			509	4,875	1,432	215	30	211	878	1,160
Average, 1942–44	64,626		[4] 76,786	485	3,473	1,086	199	[4] 65	312	[4] 713	

[2] Period earlier than Saturday.
[3] Correction: North Carolina, week ended March 24, typhus fever 2 (instead of 3).
[4] 5-year median, 1940–44.

Anthrax: Pennsylvania 1. *Leprosy:* Connecticut 1, North Carolina 1, Louisiana 1. *Weil's disease:* Maryland 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 12, 1945

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	1	0	2	0	6	0	0	2
New Hampshire:												
Concord	0	0	------	0	12	0	0	0	11	0	0	0
Vermont:												
Barre	0	0	------	0	0	0	0	0	4	0	0	0
Massachusetts:												
Boston	4	0	------	0	69	2	11	0	98	0	0	37
Fall River	0	0	------	0	1	0	1	0	0	0	0	2
Springfield	0	0	------	0	1	0	0	0	17	0	0	2
Worcester	0	0	------	0	5	0	5	0	16	0	0	6
Rhode Island:												
Providence	0	0	1	1	6	1	0	0	4	0	0	16
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	0	5	0	0	0
Hartford	0	0	------	0	25	0	1	0	4	0	0	1
New Haven	0	0	------	0	3	0	3	0	1	0	0	4
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	1	7	0	4	0	5	0	0	0
New York	10	1	------	2	48	17	51	2	289	0	3	65
Rochester	0	0	------	0	21	1	3	0	11	0	0	11
Syracuse	0	0	------	0	0	1	4	0	3	0	0	17
New Jersey:												
Camden	0	0	------	0	2	2	1	0	5	0	0	0
Newark	0	0	4	0	4	1	2	0	22	0	0	6
Trenton	1	0	------	0	6	1	5	0	8	0	0	0
Pennsylvania:												
Philadelphia	2	0	1	0	316	2	15	0	93	0	0	65
Pittsburgh	0	0	------	0	0	0	5	0	45	0	0	14
Reading	0	0	------	0	2	0	3	0	14	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	0	4	6	5	0	24	0	0	7
Cleveland	0	0	------	0	9	2	7	0	63	0	1	32
Columbus	0	0	------	0	2	2	2	0	6	0	0	2
Indiana:												
Fort Wayne	0	0	------	0	0	0	3	0	20	0	0	0
Indianapolis	4	0	------	1	9	0	2	0	26	0	0	1
South Bend	0	0	------	0	0	0	0	0	3	0	0	0
Terre Haute	0	0	------	0	0	0	1	0	8	0	0	0
Illinois:												
Chicago	0	0	------	1	144	5	19	0	96	0	0	12
Springfield	0	0	------	0	0	0	3	0	1	0	0	0
Michigan:												
Detroit	3	0	------	2	129	5	6	0	106	0	2	20
Flint	0	0	------	0	10	0	3	0	16	0	0	0
Grand Rapids	0	0	------	0	1	0	0	0	9	0	0	2
Wisconsin:												
Kenosha	0	0	------	0	1	0	0	0	11	0	0	1
Milwaukee	0	0	------	0	10	0	4	0	93	0	0	0
Racine	0	0	------	0	0	0	0	0	5	0	0	1
Superior	0	0	------	0	13	0	0	0	2	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	0	0	0	0	8	0	0	0
Minneapolis	0	0	------	0	7	0	3	0	18	0	0	1
St. Paul	0	0	------	0	0	1	3	1	7	0	0	8
Missouri:												
Kansas City	0	0	------	0	5	2	6	0	24	0	0	1
St. Joseph	0	0	------	0	0	0	0	0	5	0	0	0
St. Louis	8	0	------	0	6	2	7	0	13	0	0	4

City reports for week ended May 12, 1945—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	0	0	1	0	1	0	0	1
Nebraska:												
Omaha	0	0	------	0	13	0	6	0	23	0	0	0
Kansas:												
Topeka	0	0	------	0	1	0	1	0	9	0	0	2
Wichita	0	0	------	0	0	0	2	0	8	0	0	0
SOUTH ATLANTIC												
Maryland:												
Baltimore	8	0	1	1	6	0	11	0	77	0	0	67
Cumberland	0	0	------	0	0	0	0	0	2	0	0	0
Frederick	0	0	------	0	0	0	1	0	0	0	0	0
District of Columbia:												
Washington	1	0	1	0	4	1	6	0	35	0	1	7
Virginia:												
Lynchburg	0	0	------	0	0	0	0	0	3	0	0	0
Richmond	0	0	------	0	5	0	4	0	9	0	0	1
Roanoke	0	0	------	0	1	0	0	0	1	0	0	2
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	0
Wheeling	0	0	------	0	4	0	1	0	1	0	0	1
North Carolina:												
Raleigh	0	0	------	0	2	0	3	0	0	0	0	3
Wilmington	0	0	------	0	1	0	0	0	0	0	0	23
Winston-Salem	0	0	------	0	0	0	0	0	5	0	0	9
South Carolina:												
Charleston	0	0	------	0	2	0	0	2	0	0	2	0
Georgia:												
Atlanta	0	0	1	1	0	0	0	0	15	0	0	0
Brunswick	0	0	------	0	0	0	0	0	0	0	0	2
Florida:												
Tampa	1	0	------	0	0	1	2	0	0	0	0	3
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	1	30	1	5	0	6	0	0	5
Nashville	0	0	------	0	1	0	2	0	7	0	0	0
Alabama:												
Birmingham	0	0	------	0	4	0	5	0	3	0	0	3
Mobile	0	0	1	0	0	1	1	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	3	0	3	0	0	0	0	0	0	1
Louisiana:												
New Orleans	2	0	------	0	29	0	7	0	7	0	0	6
Shreveport	1	0	------	0	0	0	2	0	0	0	0	0
Texas:												
Dallas	3	0	------	0	13	0	4	1	2	0	0	1
Galveston	0	0	------	0	0	0	2	0	0	0	0	0
Houston	3	0	------	0	0	2	3	0	1	0	0	0
San Antonio	1	0	1	1	1	0	3	0	0	0	0	0
MOUNTAIN												
Montana:												
Billings	2	0	------	0	0	0	2	0	3	0	1	0
Great Falls	0	0	------	0	3	0	0	0	0	0	0	0
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	6	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	1	0	0	0	1	0	0	0
Colorado:												
Denver	2	0	1	2	9	1	1	0	12	0	0	5
Pueblo	0	0	------	0	0	0	1	0	2	0	0	2
Utah:												
Salt Lake City	0	0	------	0	115	1	0	0	5	0	0	7

City reports for week ended May 12, 1945—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	------	0	31	0	6	0	14	0	0	5
Spokane	1	0	1	0	7	0	1	0	2	0	0	0
Tacoma	0	0	------	0	10	1	1	0	7	0	1	7
California:												
Los Angeles	3	0	4	2	57	2	5	0	47	0	0	49
Sacramento	5	0	------	0	9	0	2	0	21	0	0	3
San Francisco	1	0	------	0	125	2	2	0	60	0	0	13
Total	67	1	20	16	1,372	66	284	6	1,614	0	11	569
Corresponding week, 1944	46	------	54	15	5,618	------	363	------	2,090	1	15	324
Average, 1940–44	61	------	70	[1] 22	[2] 5,959	------	[1] 365	------	1,611	1	16	1,067

[1] 3-year average, 1942–44.
[2] 5-year median, 1940–44.

Anthrax.—Cases: Philadelphia 1.
Dysentery, bacillary.—Cases: Springfield, Mass., 1; Providence, 1; New York, 6; Detroit, 1; Charleston, S. C., 9; Tampa, 1.
Dysentery, unspecified.—Cases: San Antonio, 29.
Rocky Mountain spotted fever.—Cases: Lynchburg, 1; Salt Lake City, 1.
Tularemia.—Cases: Raleigh, 2; New Orleans, 1.
Typhus fever, endemic.—Cases: Wilmington, N. C., 2; Winston-Salem, 1; Tampa, 2; Birmingham, 1; Dallas, 1; Houston, 2.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population, 1943, 34,157,500)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	10.5	0.0	2.6	2.6	322	7.8	60.1	0.0	434	0.0	0.0	183
Middle Atlantic	6.0	0.5	2.3	1.4	188	11.6	43.0	0.9	229	0.0	1.4	82
East North Central	4.9	0.0	0.0	2.4	202	12.2	33.4	0.0	297	0.0	1.8	48
West North Central	15.9	0.0	0.0	0.0	64	9.9	57.7	2.0	231	0.0	0.0	34
South Atlantic	17.7	0.0	5.3	3.5	44	3.5	49.4	3.5	261	0.0	5.3	208
East South Central	0.0	0.0	5.9	5.9	207	11.8	76.7	0.0	94	0.0	0.0	47
West South Central	28.7	0.0	11.5	2.9	132	5.7	60.3	2.9	29	0.0	0.0	23
Mountain	31.8	0.0	7.9	15.9	1,064	15.9	39.7	0.0	183	0.0	7.9	111
Pacific	15.8	0.0	7.9	3.2	378	7.9	26.9	0.0	239	0.0	1.6	122
Total	10.3	0.2	3.1	2.4	210	10.1	43.5	0.9	247	0.0	1.7	87

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on March 8, 1945, in District 10A, Paauhau area, Honokaa, Hamakua District, Island of Hawaii, T. H., was proved positive for plague on March 18, 1945.

Panama Canal Zone

Notifiable diseases—March 1945.—During the month of March 1945, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	16				11		7		34	
Diphtheria	6	3	1				1		8	3
Dysentery:										
Amebic	2		1				4		7	
Bacillary	2		3		2				7	
Malaria [1]	11		5		48		63	1	127	1
Measles	2				12		1		15	
Meningitis, meningococcus							1		1	
Mumps	2				1		2		5	
Paratyphoid fever	1		1		3	1			5	1
Pneumonia		12		1	27	1		1	[2] 27	15
Relapsing fever							1		1	
Scarlet fever					1				1	
Tuberculosis		19		8	2			11	[2] 2	38
Typhoid fever			1	1			2	1	3	2
Whooping cough					2				[2] 2	

[1] 34 recurrent cases.
[2] Reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended April 28, 1945.—During the week ended April 28, 1945, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		36		100	247	39	9	41	140	612
Diphtheria	2	3	1	21	6	2		1		36
Dysentery:										
Bacillary				2						2
Unspecified									26	26
German measles		4		3	27	1	1	16	16	68
Influenza		29			63	1			10	103
Measles		3		195	86	7	68	52	323	734
Meningitis, meningococcus				1	4					5
Mumps		12	1	148	117	31	59	165	24	557
Scarlet fever		4	14	41	77	8	5	20	26	195
Tuberculosis (all forms)		10	9	174	49	36	1	17	42	338
Typhoid and paratyphoid fever		2		12	4			2	1	21
Undulant fever				3						3
Venereal diseases:										
Gonorrhea	3	15	25	64	154	36	27	11	54	389
Syphilis	1	17	4	119	93	10	14	7	19	284
Whooping cough		11		79	31	11	1	31	14	178

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Egypt.—For the week ended April 14, 1945, 7 cases of plague were reported in Egypt.

Morocco (French).—For the period April 21–30, 1945, 3 cases of plague were reported in Casablanca region, French Morocco.

Smallpox

Mauritania.—For the period April 21–30, 1945, 38 cases of smallpox were reported in Mauritania.

Sudan (French).—For the period April 21–30, 1945, 102 cases of smallpox were reported in French Sudan.

Togo (French).—For the period April 21–30, 1945, 35 cases of smallpox were reported in French Togo.

Typhus Fever

Algeria.—For the period April 11–20, 1945, 50 cases of typhus fever were reported in Algeria, including 10 cases in Algiers, 7 cases in Tenez, and 1 case in Bone.

Egypt.—For the week ended April 14, 1945, 1,106 cases of typhus fever were reported in Egypt. For the week ended March 24, 1945, typhus fever was reported in Egypt as follows: Alexandria, 28 cases, 2 deaths; Cairo, 56 cases, 5 deaths; Port Said, 2 cases; Suez, 1 case.

Iraq.—Typhus fever has been reported in Iraq as follows: Weeks ended—April 28, 1945, 31 cases; May 5, 1945, 23 cases.

Morocco (French).—For the period April 21–30, 1945, 288 cases of typhus fever were reported in French Morocco, including 5 cases reported in Casablanca and 3 cases in Rabat.

Turkey.—For the week ended May 12, 1945, 89 cases of typhus fever were reported in Turkey, including 1 case each in Izmir, Antalya, Istanbul, Sinop, Adana, and 4 cases in Zonguldak.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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